REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested.

Claims 40-58 have been rejected under 35 USC § 112 and under 35 USC § 102 as being anticipated by Robinson US patent 6,894,632, hereinafter Robinson. Applicant respectfully traverses the rejections.

Amendments to the Drawings

Examiner has objected to the drawings because certain blocks are unlabeled. Applicant has corrected the drawings accordingly and replacement sheets for all the drawings are attached hereto in compliance with 37 CFR 1.121(d).

Amendments to the Specification

Examiner has required a new title which more clearly describes the invention as claimed. Applicant has amended the specification by substituting a new title.

Examiner has required a reference to prior international application. Applicant has so amended the specification.

Applicant has amended the Abstract for improved clarity and the amended Abstract is presented on a single sheet of paper in both marked up and clean versions.

Applicant amends herein the specification in order to correct spelling and other grammatical errors and for correcting and/or adding reference numbers. Specifically, Examiner has correctly noted that signal 57 is an output signal not in input signal. Applicant has corrected accordingly reference number 57 to 58 as input to analog circuit 51.

Examiner (in section 6) has requested clarification of the terms "model" and "system" as used in the specification. The term "model" is used throughout the specification in the mathematical sense, typically to estimate the relationship between inputs and outputs such as of analog circuit (MIMO system) 51. The term "system" refers to "hardware", "software" and/or a combination thereof including circuit elements. In the context of the present application, in which multiple circuits are cascaded, the term "system" also refers to the cascade.

Examiner (in section 7) has requested clarification regarding the operation of sampler 50, specifically, regarding how the model is identified when DSP 53 has no

connection to the input side of sampler 50. During the training (see Figs. 2 and 3 and description thereof) of sampler 50, DSP 53 is connected to the input of sampler 50. During training, known training signals are injected to the input of sampler 50 and the effect of the known inputs is observed on outputs 57 of sampler 50. Therefore during operation the model is estimated by DSP 53 only from outputs 57 into DSP 53

Claim Rejections under 35 USC § 112

Claims 40 and 52 have been rejected under 35 U.S.C §112 (presumably) under second paragraph as not particularly pointing out and distinctly claiming the subject matter which the Applicant regards as his invention. Specifically, the Examiner notes that the term "sampling" in the preamble may not be fully consistent with the element used on in the body of the claims, " ...*calculating a digital output signal*...

Examiner has further rejected claim 40 because the term "system" is indefinite.

While continuing to traverse the Examiner's rejections, and without in any way prejudicing the patentability of the rejected claims, the Applicant has, in order to expedite the prosecution, chosen to amend the claims thereby rendering moot Examiner's rejections.

Specifically, Applicant has replaced the phrase in the preamble of claims 40 and 52, "A method for sampling....." with "*A method for providing a digital output signal representing at least one analog input signal.....*"

Applicant has amended the element "system" in claims 40-53 referring to MIMO system 51 with another term used interchangeably, *analog circuit* 51. (see original abstract). The term *system* has replaced the term "sampler" in order to be consistent with the amendment in the preambles of claims 40 and 52. The amendment to the Title is also eliminates the term "sampler" to be consistent with the claims as amended herein.

Claim 41 has been rewritten, rendering moot Examiner's rejections based on unclear terminology.

In claim 43, "the value" has been removed.

Regarding claims 47-48, Applicant has already clarified the use of the term *analog training signals*. The training is performed using known *analog training signals* so

DSP 53 can classify or identify a model of system 50 based on output discrete correction signals 57. *Analog training signals* are not input to system 50 at the same time as *analog input signals.* Claim 41 as amended herein includes a training step in order to improve the overall understanding and clarity of the claims. New claim 59 includes the limitation of time continuous analog monitoring outputs, formerly in claim 41. New claim 60 includes the unified model limitation formerly in claim 41.

Claim Rejections under 35 USC § 102

The References and Differences of the Present Invention Thereover:

Prior to discussing the claims, Applicant will first discuss the referenceof the prior art of record and the novelty of the present invention and its unobviousness over the references. By way of introduction, Applicant respectfully affirms that there is a fundamental difference between the present invention and Robinson.

Robinson discloses systems and methods that employ a programmable analog-to-programmable digital converted system. A programmable analog-to-digital converter system includes a quantizer assembly and configuration control. The quantizer assembly is configurable to provide at least one quantization stage. A given quantization stage converts an associated analog signal into an associated digital output signal. The configuration control selects among configurations and configures the analog-to-digital converter system according to the selected configuration. The quantizer assembly is configurable to provide a plurality of quantization stages arranged in series in a first configuration, or to provide a single quantization stage in a second configuration.

The present invention is a system and method for providing a digital output signal (59) representing an analog input signal (54) in a system (50) including an analog circuit (51) and a control unit (52). Analog circuit (51) preferably features high bandwidth, high gain, and low current consumption. Analog circuit (51) is preferably implemented with low accuracy components. Control unit (52) keeps error outputs (55) of analog circuit (51) at a minimal value so that control unit (52) cancels analog input signal (54) by outputting discrete value signals (58) in a feedback loop as input

(58) to analog circuit (51). A DSP (53) of system (50) is previously trained using known analog signals and a model relating inputs (54,58) to error outputs (55) of analog circuit (51) is previously known. During operation, a digital representation (57) of the discrete value signals (58) is fed to DSP (53) that reconstructs analog input signal (54) by knowing from the prior training the effect of control unit (52) and the model of analog circuit (51).

Examiner (section 7, page 5) has understood the claims as an analog to digital converter with a digital-to-analog converter in its feedback path. Applicant does not know from where in the claims or in the present application does the Examiner have this understanding. A digital-to-analog converter is not recited in the claims and appears in Figure 2 as part of an exemplary embodiment for the training step of system (50). A digital-to-analog converter is also mentioned as a possible component of control unit 52 [para 0054]

Independent Claims 40, 52, 54 and 55

Applicant respectfully submits that independent claims 40,52,54, and 55 are not anticipated by Robinson based on the following rulings:

> A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)

> To serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with recourse to extrinsic evidence. Such evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991)

> Extrinsic evidence may be used to explain but not expand the meaning of terms and phrases used in the reference relied upon as anticipatory of the claimed subject matter. *In re Baxter Travenol Labs.*, 952 F.2d 388, 21 USPQ2d 1281 (Fed. Cir. 1991)

It is well known that in order to establish a case for anticipation, it is required to find in a single prior art reference all the elements or steps of a claim, which in the art of electronics for a device claim includes all the circuit elements recited in the clams and the connections between them or all the steps of a method claim. Applicant

respectfully submits it is inappropriate to establish a case for anticipation for all the claims of the present application without providing evidence that the prior art indeed teaches all the circuit elements and inter-connections thereof or all the steps of the method disclosed. Moreover, Applicant has carefully reviewed Robinson and has found that not only does Robinson not teach any embodiment of the present invention but being that Robinson teaches a configurable system, none of the possible configurations of Robinson's circuit can be rendered into an embodiment of the present invention. Hence, Robinson cannot be used to reject the present claims even based on obviousness. If applicable and appropriate, during the prosection Applicant will be able to provide a declaration regarding this point. In contrast, unlike the disclosure of Robinson, after training (of system 50) the present invention is not configurable and does not require calibration of any kind. Moreover, Examiner has not established any case for any of the claims whatsoever regarding method steps, particularly setting up of system 50, training followed by operation as an analog sampler.

Independent claims 40, 52, 54 and 55 include novel physical features or steps. Specifically, in claim 40: *for providing a digital output signal representing at least one analog input signa*l novel steps include: *feeding an analog circuit with ....discrete correction signals; wherein said at least one analog input signal and said discrete correction signals are jointly related by a relationship to said analog monitoring outputs by a model having an identification algorithm; .... implementing a negative feedback control loop by said feeding said analog circuit with said discrete correction signals, in order to keep at least one of said analog monitoring outputs to be within a previously defined constraint*; etc.

In claim 52, novel steps include: *(a) providing for each said stage, ... at least one analog signal from a preceding stage and at least one discrete correction signal*; ...
(d) *providing, for each stage of said system, said at least one discrete correction signal, by using information from other stages said information including at least one analog monitoring output, and by further using a synchronization clock, wherein said at least one discrete correction signal performs a negative feedback control loop in order to control said at least one analog monitoring output;* (e) *receiving and storing from each said stage, a digital representation of said at least one discrete correction signal*;etc.

In claim 54, novel features include: *(d) a mechanism which performs a comparison of said integrated signal with at least one threshold, and adds at least one previously defined correction to said amplified analog signal, and registers an output of said comparison in a digital logic.*

In claim 55, novel features include: *(d) a mechanism which provides, at least one discrete correction signal to said analog input signal, by using information from at least one other said stage, wherein said at least one discrete correction signal performs a negative feedback control loop which controls said analog input signal; and (e) a mechanism which receives and stores, a digital representation of said at least one discrete correction signal.*

Novel physical features of Independent claims 40,52,54, and 55 Produce New and Unexpected Results

Prior art analog-to digital converters (such as Robinson) or analog samplers are well known. The prior art sampler is designed to provide accurate conversion of each analog sample to its digital equivalent. Inputs to prior art samplers are analog signal(s) and a clock or other deterministic signals. Prior art sampler is a system containing linear components, non-linear components, amplifiers, and optionally, delay elements and decision elements that output bits as function of its input, such as comparators or small analog to digital converters of 2 bits. Prior art samplers require calibration in order to compensate for the inaccuracy of its components. Specifically, gains and offsets of prior art samplers are adjusted in order to achieve digital representation of the sampled analog signals of sufficient accuracy. Alternatively, the prior art sampler requires calibration of its output in the digital domain.

The present invention performs analog-digital-conversion in a fundamentally different way from prior art analog-to digital converters and does not require accurate components nor calibration of any kind for achieving high performance.

In view of the above amendments and remarks it is respectfully submitted that independent claims 40,52,54, and 55 and claims dependent therefrom are in condition for allowance. Prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,

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